sure on the polymorphic transitions of 30 substances.

4. *On Isothermally Conjugate Nets of Space Curves:* GABRIEL M. GREEN, Department of Mathematics, Harvard University.

A necessary and sufficient condition that a conjugate net of curves on a surface be isothermally conjugate is that at each point of the surface the pair of axis tangents, the pair of associate conjugate tangents, and the pair of anti-ray tangents be pairs of the same involution.

5. *The Rôle of the Liver in Acute Polycythaemia: The Mechanism Controlling the Red Corpuscle Content of the Blood:* PAUL D. LAMSON, Pharmacological Laboratory, Johns Hopkins University.

There is in the body a mechanism for regulating the red corpuscle content of the blood; this mechanism is under nervous control, responding to nervous, chemical and emotional stimuli; the adrenal glands play a part in this mechanism, and the liver is the seat of the changes which increase the number of red cells, partly by a reduction in plasma volume, and partly by bringing cells into the circulation which are not normally present.

6. *The Potentials at the Junctions of Salt Solutions:* DUNCAN A. MACINNES, Laboratory of Physical Chemistry, University of Illinois.

The author calls attention to the fact that the liquid junction potential E_L of a concentration-cell of the type $Ag + AgCl$, $KCl(C_1)$, KCl (C_2), $AgCl + Ag$ can be derived from measurements of its electromotive force E and of the cation-transference number n_c with the aid of the equation $E_L/E = (2n_c - 1)/2n_c$. This equation involves only the assumption that the work attending the transfer from one concentration to the other of one equivalent of ion is the same for the cation as for the anion. The author substantiates this assumption by showing that this equation, when applied to the electromotive force data of Jahn, leads to nearly the same values of $E - E_L$ (which should equal the difference in the two electrode-potentials) whether the electrolyte be KCl, NaCl or HCl.

7. *A Statistical Study of the Visual Double Stars in the Northern Sky:* ROBERT G. AITKEN, Lick Observatory, University of California.

At least one in every 18, on the average, of the stars as bright as 9.0 magnitude in the northern half of the sky is a double star visible with the 36-inch telescope. Close visual double stars are relatively more numerous in the Milky Way than elsewhere in the sky, and visual double stars as a rule revolve in relatively small orbits. Close visual double stars are rare among stars of either very early or very late spectral class.

8. *Walnut Mutant Investigations:* ERNEST B. BABCOCK, Division of Genetics, Department of Agriculture, University of California.

The mutation takes place in female flowers only and appears in the first generation after the mutation occurs but on crossing with the species type it is completely recessive in the F_1 generation and the nature of the mutation is such that only certain genetic factors are affected without having the chromosome number disturbed.

9. *Hereditary Fragility of Bone:* C. B. DAVENPORT AND H. S. CONARD, Carnegie Institution of Washington and Grinnell College, Iowa.

Of a parent who early in life was affected with brittle bones at least half the children will be similarly affected, but if neither parent, though of affected stock, has shown the tendency, then expectation is that none of the children will have brittle bones.

E. B. WILSON

SPECIAL ARTICLES

ON THE OCCURRENCE IN THE SOUTHERN HEMISPHERE OF THE BASKING OR BONE SHARK, CETORHINUS MAXIMUS

SINCE it does not seem generally to be known that this giant elasmobranch is found in southern waters, it may be of interest briefly to give the following data which have been noted from time to time in the course of other ichthyological studies.

The old writers thought that this great beast was confined to the far north Atlantic and to the Arctic Ocean. Of these, Friedrich Faber

may be quoted. In his Natural History of the Fishes of Iceland he says:

This giant among sharks [and he quotes Gunner that it grows to a length of 16 fathoms (Klaftern), but adds for himself that its ordinary length runs from 20–24 feet] is found only in northern seas and, moreover, is here not abundant.[1]

Goode and Bean in their monograph, "Ocean Ichthyology"[2] (1895) write:

It is unknown elsewhere than in the north Atlantic, and south of the Grand Banks on the west, and Scotland on the east may be regarded as an estray.''

Jordan and Evermann (1896)[3] give it a more extended habitat since it is "found in Arctic waters, straying south to Portugal, Virginia and California." And later Jordan (1905)[4] in his "Guide to the Study of Fishes" notes that it occurs "on all northern coasts (and is) most frequently taken in the North Sea and about Monterey Bay, California." However, Bridge (1904)[5] in the Cambridge Natural History writes:

Although generally described as a northern form, *Cetorhinus* is known to occur in Australian waters.

As might be expected from the well-known activity in ichthyological matters of the Australians, our southern references are mainly confined to the waters surrounding that continent.

Its occurrence in the antipodes was, so far as the present writer knows, first made known by Sir Frederick McCoy[6] in 1885. He figures and describes a large specimen taken at Portland on the west coast of Victoria in November, 1883. It was 30 feet 6 inches long and 20 feet in girth. He gives a very careful and minute description and very detailed measurements, the first and with one exception the only ones known to the present writer.

William Macleay,[7] whose paper was apparently published in the same year as McCoy's but slightly later, merely lists the basking shark in Australian waters on the authority of the latter, and gives no new data.

We next hear of *Cetorhinus* in 1901, when two specimens were taken at Eden, New South Wales, and were recorded by Mr. E. R. Waite in the following year.[8] Of the first specimen only a piece of "baleen" or gill-rakers reached Mr. Waite, but this was sufficient for its identification. However, in August, 1901, a young male 10½ feet long was taken at the same place and sent to the Australian Museum, Sydney.

A more extended account of the occurrence of this great shark in these southern waters is from the pen of Mr. J. A. Kershaw[9] of the National Museum at Melbourne, Australia. His specimen, which was a young male 12 feet and 11 inches long, was taken in Hobson's Bay near Williamstown, Victoria, in May, 1903. Mr. Kershaw gives a series of very full and carefully made measurements, the only one except McCoy's that seem ever to have been recorded. Its length lacked but one inch of 13 feet and its girth in front of the first dorsal was 3 feet 7 inches. Of Kershaw's careful description the most noteworthy point refers to the snout, which will be discussed later.

Stevenson (1904)[10] says that the basking

1 Faber, Friedrich, ''Naturgeschichte der Fische Islands,'' p. 20. Frankfurt am Main, 1829.

2 Goode, George Brown, and Tarleton H. Bean, ''Ocean Ichthyology,'' p. 22. Washington, 1895.

3 Jordan, David Starr, and Barton W. Evermann, ''The Fishes of North and Middle America,'' Vol. I., p. 51. Washington, 1896.

4 Jordan, David Starr, ''A Guide to the Study of Fishes,'' Vol. I., p. 540. New York, 1905.

5 Bridge, T. W., ''Fishes'' in the Cambridge Natural History, Vol. VII., p. 453. London, 1904.

6 McCoy, Frederick, ''Natural History of Victoria. Prodromus of the Zoology of Victoria,'' Decade XI., pp. 11–15, Plate 104, 1885.

7 Macleay, William, ''Supplement to Descriptive Catalogue of the Fishes of Australia,'' *Proceedings Linnæan Society of New South Wales*, Vol. IX., pp. 62–63.

8 Waite, E. R., ''New Records or Recurrences of Rare Fishes from Eastern Australia,'' Records Australian Museum, Vol. IV., p. 263, 1902.

9 Kershaw, James A., ''Notes on a Rare Victorian Shark,'' *The Victorian Naturalist*, Vol. XIX., p. 62, 1903.

10 Stevenson, Charles H., ''Aquatic Products in Arts and Industries,'' Report U. S. Fish Commission, Vol. XXVIII. for 1902, pp. 227–228, 1904.

shark is found on the coasts of Australia, Ecuador and Peru. So abundant are they in the latter region that a profitable fishery is carried on, their livers being utilized for oil. Stevenson quotes a Captain Baker, of New Bedford, that he took 125 barrels of basking-shark liver oil in 2 days. Stevenson further says that this great shark is reported to be taken at Kurrachee in northwest British India. All the authorities are agreed, however, that this latter shark is *Rhineodon typus*, the whale shark.

Last of all, Stead (1906)[11] notes that *Cetorhinus* is found on the coasts of New South Wales and Victoria, but not abundantly. This statement is probably based on the accounts of McCoy, Waite and Kershaw.

Even McCoy's notice is, however, *not* the first on the occurrence of this great shark in the South Seas, for Bennett (1840)[12] in his zoology of the voyage of the whaleship *Tuscan* tells us that:

> While cruising in the south Pacific, we occasionally observed large animals which bore a great resemblance to whales (excepting that their tail-fin was perpendicular, and they did not spout), swimming near the surface of the sea. They appeared to be nearly 20 feet in length, and were called by the whalers bone-sharks, a name which implies little more than the very vague idea entertained of their true character. They are said to have whalebone in the mouth, yet do not spout; but partake of the nature of a shark, or other fish, and, like fish, can maintain a submarine existence for an indefinite time. They have been occasionally mistaken for whales, and harpooned by inexperienced whalers, when, taking away the line with irresistible impetuosity, they have disappeared in the ocean's depths, and left their assailants to watch in vain for their return to the surface.
>
> Since whalers religiously avoid an encounter with these troublesome creatures, it follows that their real form and structure are but little known. If we admit that an error exists on the subject of there being whalebone in its mouth, it appears probable that the bone-shark is allied to, or is identical with, the Basking-shark (*Squalus maximus*), a fish, measuring from 15 to 30 feet in length, and which was formerly regarded as a species of whale.

Before bringing this note to a close, I wish to call attention to one other matter of importance. None of the observers save Kershaw correctly gives the shape of the snout. Günther (1880) indeed says

> . . . young specimens have a much longer and more pointed snout than adults. . . .

And McCoy notes that it has a

> fusiform head very small, abruptly narrowed to a short snout, with a slightly concave profile rising from a little behind the eye . . .,

all of which structures are shown in his figure, the snout appearing as a very weak and ineffective structure.

Goode and Bean (1895) merely say "snout blunt," and their figure, which is copied from Annales du Musée d'Hist. Nat. Paris, Vol. XVIII., pl. 6; and from Fish. Ind., pl. 249, upper figure, and which in turn has been widely copied (and is the only one save McCoy's known to the present writer), so shows it. Jordan and Evermann (1896), for example, simply copy Goode and Bean's text and figure. So practically does Bridge (1904). While Jordan (1905) calls it elephant shark but assigns no reason for the name.

Kershaw (1903) specifically notes that

> . . . the front of the head is considerably extended, and forms a thick, fleshy, truncated snout, with the extremity produced into a curved fleshy hook, which altogether gives the fish a most extraordinary appearance.
>
> This peculiarity, according to some earlier observers, occurs only in the young specimens, and has led to the erroneous opinion[13] that several different genera and species of basking sharks existed, an opinion which can hardly be wondered at considering the greatly different appearance this gives to the fish.

This specimen was a young one, only 12 feet 11 inches long; however, a year previous a fisherman had reported to Kershaw the capture in Melbourne Harbor of a large shark having "a long thick snout terminating in a hook."

11 Stead, David G., "Fishes of Australia," pp. 233, 235, 236, 251. Sydney, 1906.

12 Bennett, F. D., "Narrative of a Whaling Voyage Round the Globe, from the Year 1833 to 1836," Vol. II., London, 1840.

13 Günther, A. C. L., "Introduction to the Study of Fishes," p. 323, Edinburgh, 1880.

The present writer has recently had an opportunity to examine in a traveling museum a mounted 36-foot specimen of *Cetorhinus maximus* taken in Monterey Bay, California. This had a thick and stout but very marked snout, bluntly conical in shape, which projected at least 15 inches in front of the upper jaw and from 18–20 inches over the lower jaw. It is interesting that such a marked structure should have so long escaped notice, but on the other hand opportunities to examine this giant shark come very rarely to properly trained naturalists. However, it seems from the above data that Jordan's name, elephant shark, is by no means a misnomer. E. W. GUDGER

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LABELING CHEMICAL SPECIMENS

PROBABLY every teacher of chemistry makes some use of samples of chemical elements and compounds in his lectures. In some cases, the set of specimens may have been purchased complete, in uniform style containers, with systematic and uniform labeling. Quite often, however, the additions to a chemical museum are made gradually, and as a result the collection may consist of all sorts, sizes and varieties of containers with an equally varied assortment of labels. When a set of specimens grows in this way, one can scarcely make use of serial numbers alone. An expansible system is necessary. The writer has used such a system for several years, with increasing satisfaction.

This labeling system has so far been used only for elements and inorganic compounds. It corresponds in principle to the usual library method of labeling books. A chemical catalogue of a leading firm was used as the source of the names. The list of chemicals being really quite comprehensive, it was possible to give a label number to the name of each substance one would ever be likely to include in a collection, writing these label numbers directly into the catalogue. The list of the chemical elements, in alphabetical order, was taken as the starting point. Names of elements beginning with the same letter are given serial numbers, as for example, magnesium is called M 1; manganese, M 2; mercury, M 3; molybdenum, M 4; aluminium, A 1; and ammonium compounds are placed under A 2. Specimens of the elements are labeled thus: Aluminium, A 1.0. When several kinds of samples of an element are included they are labeled thus: Aluminium, A 1.0 sh; aluminium, A 1.0 po; aluminium, A 1.0 le; the letters "sh," "po" and "le" stand respectively for "sheet," "powder" and "leaf." The method of labeling compounds may be illustrated by a few from the sodium list:

Sodium acetate, cryst.	S 6 a
Sodium acetate, fused	S 6 a 2
Sodium acid carbonate	S 6 ca
Sodium carbonate, dry	S 6 ca 4
Sodium chlorate	S 6 ch
Sodium chloride	S 6 chl
Sodium cyanide	S 6 cy
Sodium iodate	S 6 io
Sodium iodide	S 6 io 2
Sodium acid sulphate, powd.	S 6 su
Sodium acid sulphate, fused	S 6 su 3
Sodium sulphate, cryst.	S 6 su 4
Sodium sulphate, powd.	S 6 su 5
Sodium sulphide	S 6 sul
Sodium acid sulphite	S 6 sul 3
Sodium sulphite, cryst.	S 6 sul 4
Sodium sulphite, powd.	S 6 sul 5
Sodium sulphocyanate	S 6 sul 6
Sodium thiosulphate, cryst.	S 6 th
Sodium thiosulphate, powd.	S 6 th 2

Where omissions occur, as between "S 6 ca" and "S 6 ca 4," it is understood that other compounds or different forms of the same compound are to be supplied. These are, of course, to be found in the complete chemical catalogue.

From these examples it may be seen that the bottles, marked in this way, can always be kept in alphabetical order, and can scarcely be misplaced if the labels are read as to letters and numbers. Any sort of helper, who knows his alphabet and can count, will be able to take out specimens and replace them without confusion. New samples can be easily inserted anywhere, and given a label which shows exactly where it belongs.